

## CLAIMS

1. A layer 2 switch network system that accommodates a terminal, and a plurality of layer 2 switches including an edge switch that is located at an edge of a network and  
5 serves as a wireless access point, the layer 2 switch network system comprising:

a temporary-MAC-address notifying unit that notifies the edge switch of a temporary MAC address allocated to the terminal; and

10 the edge switch that acquires the temporary MAC address corresponding to the terminal from the temporary-MAC-address notifying unit, that stores therein swap data which associates the acquired temporary MAC address with a real MAC address, that converts a real MAC address of a  
15 source set in a MAC frame to a temporary MAC address of the source if the edge switch receives the MAC frame from the terminal, and that converts a temporary MAC address of a destination set in the MAC frame to a real MAC address of the destination if the edge switch transmits the MAC frame  
20 to the terminal.

2. The layer 2 switch network system according to claim 1, wherein

the temporary-MAC-address notifying unit is a  
25 temporary-MAC-address transaction server that is connected to the layer 2 switch network and that generates the temporary MAC address allocated to each terminal, and

if the edge switch confirms that the terminal is a legal terminal in an authentication phase between the edge  
30 switch and the terminal, the edge switch acquires the temporary MAC address corresponding to the terminal from the temporary-MAC-address transaction server.

3. The layer 2 switch network system according to claim 1, wherein

the temporary-MAC-address notifying unit is the terminal,

5 the terminal stores therein the temporary MAC address acquired in advance, and notifies the edge switch of the stored temporary MAC address at time of establishing an association with the edge switch, and

the edge switch acquires the temporary MAC address  
10 corresponding to the terminal from the terminal during an association procedure.

4. The layer 2 switch network system according to claim 1, wherein

15 if an access target edge switch is changed by movement of the terminal or switching of a wireless interface to be used, then an old edge switch holding swap data on the terminal transfers the swap data to a new edge switch, and the new edge switch stores therein the transferred swap  
20 data.

5. The layer 2 switch network system according to claim 2, wherein

the layer 2 switch network is a heterogeneous wireless  
25 integrated network that accommodates a terminal including a plurality of wireless interfaces each having a common IP address, and

the temporary-MAC-address transaction server allocates a common temporary MAC address to each of a plurality of  
30 real MAC addresses corresponding to the plurality of wireless interfaces of one terminal.

6. The layer 2 switch network system according to claim 3,

wherein

the layer 2 switch network is a heterogeneous wireless integrated network that accommodates a mobile terminal including a plurality of wireless interfaces each having a common IP address, and

the terminal allocates a common temporary MAC address to each of a plurality of real MAC addresses corresponding to the plurality of wireless interfaces of one terminal.

7. The layer 2 switch network system according to claim 1, wherein the edge switch performs a processing for updating a correspondence table, which is held by the plurality of layer 2 switches that constitute the network, between the temporary MAC address and an output port for the MAC frame the destination of which is the temporary MAC address, after storing therein the swap data.

8. The layer 2 switch network system according to claim 2, wherein

the temporary-MAC-address transaction server is an authentication server,

the authentication server updates the temporary MAC address at predetermined time interval, and causes the edge switch to update the swap data stored in the edge switch and to update a correspondence table, which is held by a neighbor discovery server, between an old temporary MAC address and an IP address to a correspondence table between a new temporary MAC address and the IP address according to update of the temporary MAC address, and

the edge switch performs a processing for updating a correspondence table, which is held by the plurality of layer 2 switches that constitute the network, between the temporary MAC address and an output port for the MAC frame

the destination of which is the temporary-MAC address, after updating the swap data.

9. The layer 2 switch network system according to claim 2,  
5 wherein

the temporary-MAC-address transaction server is the edge switch, and

the edge switch updates the temporary MAC address at predetermined time intervals, updates the swap data stored  
10 therein according to update of the temporary MAC address, causes a neighbor discovery server to update a correspondence table, which is held by the neighbor discovery server, between an old temporary MAC address and an IP address to a correspondence table between a new  
15 temporary MAC address and the IP address, and performs a processing for updating a correspondence table between the temporary MAC address and an output port for the MAC frame the destination of which is the temporary MAC address, the correspondence table between the temporary MAC address and  
20 the output port held by the plurality of layer 2 switches that constitute the network.

10. The layer 2 switch network system according to claim 9, wherein the edge switch stores therein correspondence  
25 between the old temporary MAC address and the new temporary MAC address for a certain period of time after updating the temporary MAC address, and swaps the old temporary MAC address with the new temporary MAC address and performs subsequent processing if the edge switch receives the MAC  
30 frame the destination of which is the old temporary MAC address during the certain period of time.

11. The layer 2 switch network system according to claim 1,

wherein the edge switch snoops a neighbor solicitation IP packet and converts the real MAC address of the source set in the MAC frame including the neighbor solicitation IP packet and the real MAC address of the source set in the  
5 neighbor solicitation IP packet to corresponding temporary MAC addresses, respectively when the terminal transmits the neighbor solicitation IP packet, and the edge switch snoops a neighbor advertisement IP packet and converts the real  
10 MAC address of the source set in the MAC frame including the neighbor advertisement IP packet and a target real MAC address set in the neighbor advertisement IP packet to corresponding temporary MAC addresses, respectively when the edge switch receives the neighbor advertisement IP packet from the terminal.

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12. The layer 2 switch network system according to claim 1, wherein if a neighbor discovery server makes a neighbor discovery, then the neighbor discovery server stores and registers therein a correspondence table between the  
20 temporary MAC address of the source set in the MAC frame including a neighbor solicitation IP packet and an IP address of the source set in the neighbor solicitation IP packet when the neighbor discovery server receives the neighbor solicitation IP packet, and the neighbor discovery  
25 server obtains the temporary MAC address corresponding to a target IP address set in the neighbor solicitation IP packet based on the stored and registered data and makes notification of the temporary MAC address as a target MAC address by transmitting a neighbor advertisement IP packet.

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13. The layer 2 switch network system according to claim 1, wherein the terminal regularly updates the real MAC address and/or the temporary MAC address allocated to the terminal

per terminal interface synchronously with operation of the edge switch.

14. The layer 2 switch network system according to claim 5, 13, wherein the terminal operates to capture the MAC frame, the destination of which is an old real MAC frame and the MAC frame, the destination of which is a new real MAC address or the MAC frame, the destination of which is an old temporary MAC frame and the MAC frame, the destination of which is a new temporary MAC address, as the MAC frames to be transmitted to the terminal for a certain period of time.

15. The layer 2 switch network system according to claim 1, 15 wherein the edge switch encapsulates the MAC frame including the real MAC address of the source and the temporary MAC address of the destination with encapsulation information including the temporary MAC address of the source and the temporary MAC address of the destination when the edge switch receives the MAC frame including the real MAC address of the source and the temporary MAC address of the destination, and the edge switch decapsulates the MAC frame including the real MAC address of the source and the temporary MAC address of the destination converts the temporary MAC address of the destination set in the MAC frame to the real MAC address of the destination and the real MAC address of the source to the temporary MAC address of the source set as the encapsulation information when the edge switch receives the encapsulated MAC frame the destination of which is the terminal.

16. A terminal device accommodated in a layer 2 switch

network that includes a plurality of layer 2 switches including a layer 2 switch located on an edge of the layer 2 switch network or an edge switch serving as a wireless access point, wherein

5       the terminal device defines and stores therein a real MAC address and a temporary MAC address for identifying a terminal interface, includes a function of conversion between the real MAC address and the temporary MAC address, and always uses the temporary MAC address during a  
10       communication with the layer 2 switch network.

17. The terminal device according to claim 16, wherein  
      the terminal device is a mobile terminal including a plurality of wireless interfaces each having a common IP  
15       address, and

      the mobile terminal holds a common IP address common to the plurality of wireless interfaces and a common temporary MAC address common to the plurality of wireless interfaces.

20       18. The terminal device according to claim 16, wherein the terminal device regularly updates the stored temporary MAC address and/or the stored real MAC address, and notifies the edge switch of the updated temporary MAC address and/or  
25       the updated real MAC address.

19. The layer 2 switch network system according to claim 18, wherein the terminal device operates to capture a MAC frame, a destination of which is an old real MAC frame and  
30       a MAC frame, a destination of which is a new real MAC address and/or a MAC frame, a destination of which is an old temporary MAC frame and a MAC frame, a destination of which is a new temporary MAC address, as MAC frames to be

transmitted to the terminal device for a predetermined period of time.

20. A layer 2 switch network that accommodates the  
5 terminal device according to claim 16, wherein  
the edge switch regularly indicates the terminal  
device to change the temporary MAC address.

21. A layer 2 switch network system that accommodates the  
10 terminal device according to claim 18, wherein  
the edge switch stores therein correspondence between  
an old temporary MAC address and a new temporary MAC  
address for a certain period of time after updating the  
temporary MAC address, and swaps the old temporary MAC  
15 address with the new temporary MAC address and performs  
subsequent processing when the edge switch receives the MAC  
frame the destination of which is the old temporary MAC  
address during the certain period of time.